

Data Analysis of Global Warming Data

Teacher Directions

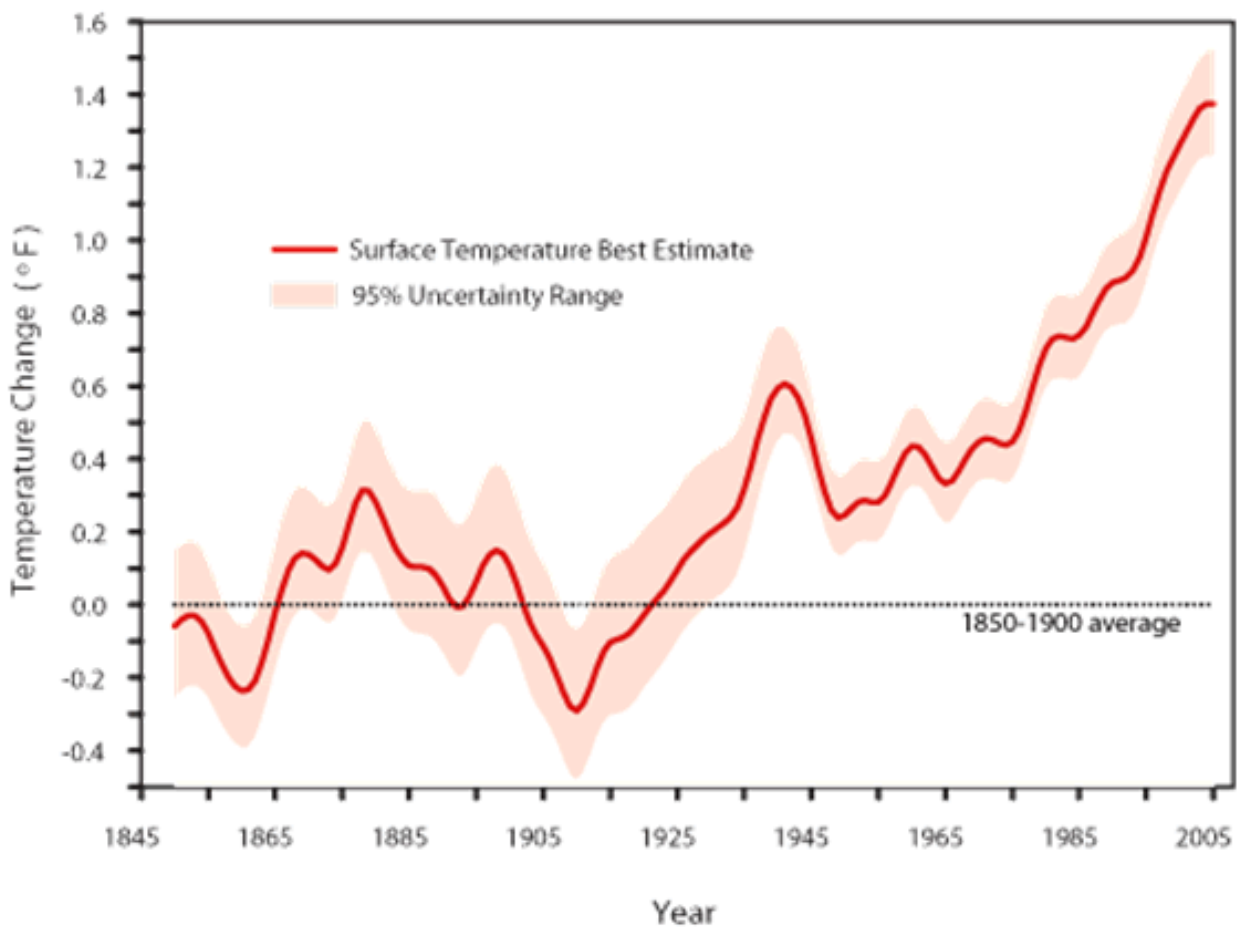
This task is designed to help students practice data analysis skills required to answer database questions on Paper 2 and 3 and to practice the skills required for laboratory work. It is suitable a class activity, a group activity, or an individual assignment.

Structured Think-Pair-Share would work well with this task. Student A could answer Questions 1 and 2, Student B could answer Questions 3 and 4. When they share answers the partner can provide assessment feedback by comparing the answer to the mark scheme. Question #5 could be completed in traditional Think-Pair-Share with each pair reporting to the class or posting their answer to #5 and then having the class review each pair's responses.

Student directions

Global Surface Temperature Trends

1850 - 2005



Data Source: Brohan, P., J. J. Kennedy, I. Harris, S. F. B. Tett, and P. D. Jones. 2006. Uncertainty estimates in regional and global observed temperature changes: a new dataset from 1850. *Journal of Geophysical Research* 111:D12106, doi:10.1029/2003JA009974.

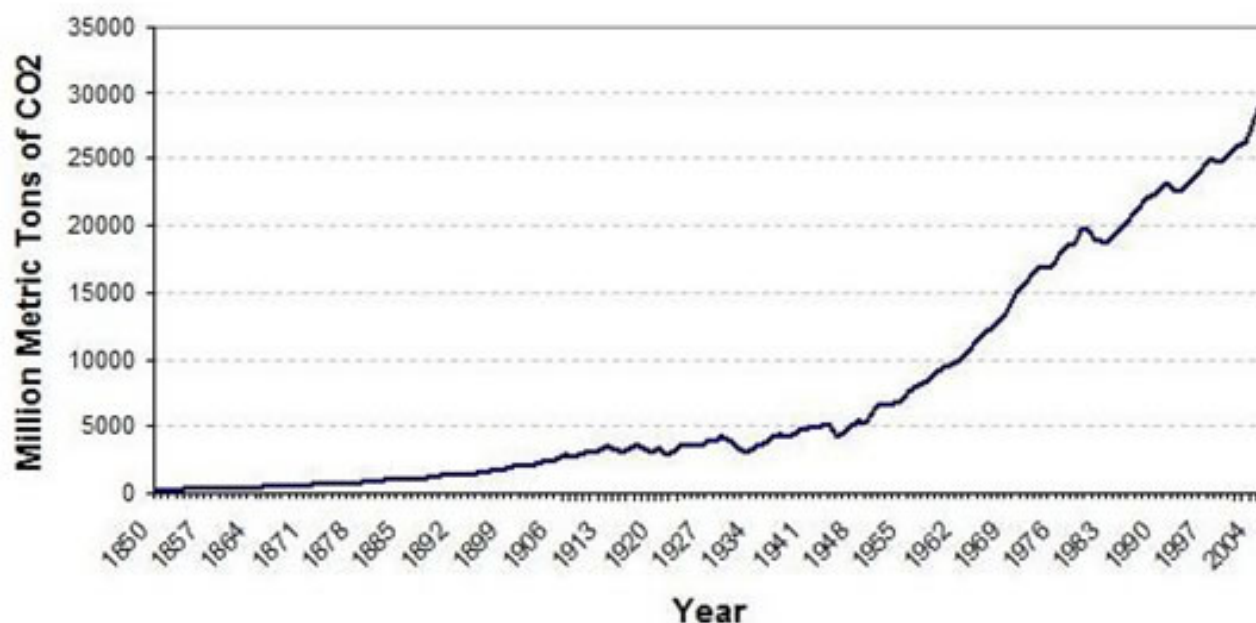
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http://www.pewclimate.org/global-warming-basics/facts_and_figures/temp_ghg_trends Figure 2A

The command term **describe** requires you to give a detailed account, while **suggest** requires you to propose an hypothesis or other possible answer.

1. **Describe** the relationship between time and surface temperature change between 1945 and 2004.
2. **Suggest** a cause for this relationship.

Historical Global CO₂ Emissions* (1850-2004)



*from Fuel Burning, Cement Manufacture, and Gas Flaring

Source: Marland et. al (2007) Global, Regional, and National CO₂ Emissions. In Trends: A Compendium of Data on Global Change. CDIAC U.S.A.

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<http://www.pewclimate.org/facts-and-figures/international Figure 5A>

3. **Describe** the relationship between time and the CO₂ emissions between 1945 and 2004.
4. **Suggest** possible causes of this relationship.

The command term **analyze** requires you to interpret data to reach conclusions.

5. **Analyze** the relationship between CO₂ emissions and surface temperature change between 1945 and 2004.

Support material

Markschemes/marketing notes:

1. Describe the relationship between time and surface temperature change between 1945 and 2004.
 - drops slightly between 1945 and 1950
 - then rises with fluctuation until 2004
 - trend line (line of best fit over this region of graph) suggests that the surface temperature is rising over time during this period.
2. Suggest a cause for this relationship.

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- conditions at the surface of the earth are causing more heat to be trapped
 - less energy from the sun is being reflected and therefore more heat reaches the earth's surface
 - more albedo effect on the earth's surface (more pavement/less ice and snow cover/tilled soil as opposed to vegetation/less vegetation)
 - heat is being generated at the earth's surface due to human caused processes (unlikely but something students may think possible)
3. Describe the relationship between time and the CO₂ emissions between 1945 and 2004.
- increasing as time increases
 - increasing faster relative to earlier parts of the graph
4. Suggest possible causes of this relationship.
- increased breakdown of complex organic materials
 - increased combustion of fossil fuels to provide energy
 - increased coal/gas combustion to provide electricity
 - increased use of gas powered transportation including automobiles/flying etc.
 - other reasonable answers
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The command term analyze requires you to interpret data to reach conclusions.

5. Analyze the relationship between CO₂ emissions and surface temperature change between 1945 and 2004.
- both CO₂ emissions and surface temperatures are increasing over same time period
 - trends in both data sets are similar over same time period
 - increased emissions leads to increased CO₂ in atmosphere which may be cause of increased temperatures

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Subject:
Biology

DP Component & Criteria:
Data-Based Questions/Paper 2,
Short-answer Questions/Paper 2 and 3

Component type:
Internal

MYP Criteria:
Group 4 / Sciences

